

REMARKS

In the Office Action dated September 8, 2005, claim 14 was rejected under 35 U.S.C. § 112, second paragraph as being indefinite due to the use of the word of "approximately" therein. Claim 14 has been amended to cancel this word, however, this does not mean that the width of the window for windowing the pulmonary parenchyma pixels must be fixed at a value of exactly 100 HU. As the Examiner has noted, even without the word "approximately" a person of ordinary skill in the relevant technology would interpret claim 14 as embodying some range around 100 HU.

Claims 1-5, 11 and 15-23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Uppaluri et al in view of Heuscher. This rejection is respectively traversed for the following reasons.

The Examiner stated the Uppaluri et al reference discloses the generation of a processed computed tomography image of a lung by generating pixels representing pulmonary parenchyma in false colors, and presenting the remaining pixels in the image with gray scale values. The Examiner stated this step is accomplished in the Uppaluri et al reference by overlaying the colored image onto the gray scale image. The Examiner acknowledged that the Uppaluri et al reference does not disclose the use of contrast agents, but the Examiner relied on the Heuscher reference as teaching the use of a contrast agent with a CT system to highlight vessels in the computed tomography image.

The Examiner concluded it would have been obvious to a person of ordinary skill in the relevant technology to use a contrast agent as taught by Heuscher in the method disclosed by Uppaluri et al. The Examiner stated that by using such a

contrast agent, vessels will be brought out in the image, which would permit a viewer of the image generated according to Uppaluri et al to more easily identify the blood vessels.

Applicants respectfully submit the Examiner has extremely over-generalized the teachings of the Uppaluri et al. The Uppaluri et al references discloses a method for automatically analyzing tissue differences, for example in CT exposures. The tissue differences are detected and segmented using different spatial frequencies in the image, as explicitly stated in the Uppaluri et al reference in the passage beginning at column 2, line 43.

With regard to the analysis of lung exposures, in the passage beginning at column 18, line 6, and in the table in column 18, Uppaluri et al show how different tissue types and pathologies can be recognized by the different structures, and therefore which areas of different characteristics spatial frequencies should be displayed with different colors. In the example of the image of a lung, this portion of the Uppaluri et al reference describes analysis of the spatial frequencies of the CT image so as to be able to show portions of the lung with different colors, dependent on a tissue structure of a lung. Because the Uppaluri et al reference define the colors based on the spatial frequencies, there is not necessarily any relationship between the HU value that is associated with a particular pixel, and the color with which that pixel will be displayed.

The Heuscher reference is but one of many hundreds, if not thousands of references that provide the well known teaching that a better representation of the coronary arteries in a CT image of the heart can be achieved by the use of a contrast agent.

Therefore, a person of ordinary skill in the field of displaying medical image information, without having had the benefit of first reading Applicants' disclosure, would simply use the Uppaluri et al reference to analyze the spatial frequencies of the CT image of a lung, and show different portions of the image in different colors dependent on their tissue structure, as derived from the spatial frequency analysis, and would also understand that vessels can be enhanced if, in addition, a contrast agent is administered.

This is not the same as the method and apparatus disclosed and claimed in the present application, wherein no color designation or formation based on spatial frequency analysis is undertaken. Instead, the entirety of the pulmonary parenchyma is shown with false color representation, with the remaining pixels being indicated in the conventional manner as gray scale values. The vessels in the region of the lung are particularly enhanced as to their gray scale values by the additional administration of contrast agent. The false colors are displayed dependent on the respective HU values of the pixels. Since the HU values can be relatively finely analyzed, slight differences in the HU values will produce noticeable color differences. In the present invention, any pixel that has the same HU value will be displayed with the same color, but this is not the case in the Uppaluri et al reference. Independent claims 1, 18 and 21 have been amended consistent with the above discussion to make clear that each pixel has an HU value associated therewith, as well as a gray scale value that is (as is conventional) dependent on the HU value of that pixel. Each of the independent claims also has been amended to make clear that, in the processed image, all of the pulmonary parenchyma pixels are displayed in false colors that respectively correspond to the different HU values of the pixels,

with the remaining pixels (i.e., those that do not represent pulmonary parenchyma) being displayed with their conventional gray scale values. This display of the remaining pixels with conventional gray scale values allows the usual enhancement with a contrast agent to even further assist in providing informational content to the image, since vessels will be highlighted, in the usual manner, by the action of the contrast agent. Thus the processed image has the dual benefit of the false colors for the pixels representing pulmonary parenchyma, the colors being selected dependent on the respective HU values of the pixels, together with the enhanced vessel imaging, obtained by the use of a contrast agent, for the pixels that are represented with gray scale values.

No such method or apparatus is disclosed or suggested in either of the Uppaluri et al or Heuscher et al references, taken singly or in combination.

Claims 6-10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Uppaluri et al and Heuscher, further in view of Wood. Claims 12-14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Uppaluri et al and Heuscher, further in view of Krauss. For the reasons discussed above in connection with the Uppaluri et al/Heuscher combination, even if the Examiner's statements concerning the Wood and Krauss references are accurate, modifying the Uppaluri et al/Heuscher combination in accordance with the teachings of either Wood or Krauss would not result in the subject matter of any of claims 6-10 or 12-14, all of which embody the subject matter of independent claim 1 therein.

All claims of the application are therefore submitted to be in condition for allowance. Early reconsideration of the application is therefore respectfully requested.

Submitted by,

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